

### **REMARKS**

Claims 1-6, 8-17 and 19-23 are all of the claims currently pending. New claim 23 is added. In the Office Action mailed on November 10, 2010, claims 1-4, 9-17, and 19-21 are indicated as allowed.

Claims 5, 6, 8, and 22 stand rejected under 35 USC §102(b) as allegedly anticipated by newly-cited US Patent Application Publication No. 2001/0051936 to Michalewicz.

Applicants respectfully traverse this rejection based on Michalewicz, since the method of this newly-cited reference differs from that defined even by independent claims 5 and 8.

#### **I. THE CLAIMED INVENTION**

In one aspect and as described in the specification and defined by, for example, claim 5, the present invention is directed to an apparatus for calculating a global optimization for a problem to be optimized. A receiver receives data related to the problem, for populating a model for the problem. A data converter converts the received data into data structures that thereby populates the model.

A first calculator, as executed by a processor on the apparatus, provides a plurality of minimum values of the model. A second calculator, as executed by the processor, locates a global optimum value for the problem, given the plurality of minimum values. A transmission port sends the global optimum to at least one of a display device, a printer, and a memory.

Conventional techniques for arriving at a global optimum, as described beginning at line 19 of page 2 of the specification, are NP-hard and difficult to resolve in a reasonable time. These conventional methods include Simulated Annealing, Genetic Algorithm, or other Monte Carlo type techniques.

The claimed invention, on the other hand, provides a method to find a global optimum to a minimum-maximum problem by first converting input data to populate a model of the min/max problem and then using this model to calculate a plurality of minimum values and then using these minimum values to locate the global optimum value.

#### **II. THE PRIOR ART REJECTION**

The Office alleges that newly-cited Michalewicz anticipates the claimed invention defined by claims 5, 6, 8, and 22.

### The Michalewicz Reference

As described in the Abstract, Michalewicz returns an optimum, or near-optimum, solution to a linear programming problem, with the user being able to influence the flexibility of the returned solution by specifying a precision coefficient. A population of possible solutions is initialized based on input parameters defining the problem. The solutions are mapped into a search space that converts a constrained problem into an unconstrained problem. Through multiple iterations, a subset of solutions is selected from the population of solutions and variation operators are applied to the subset of solutions so that a new population of solutions is initialized and then mapped. If a predetermined number of iterations has been reached, that is, if the precision coefficient has been satisfied, the substantially optimum solution is selected from the new population of solutions.

### Applicants' Analysis

The method of Michalewicz fails to satisfy the plain meaning of the claim language of the elements of independent claims 5 and 8, as follows.

First, there is no model involved in Michalewicz, let alone a conversion of data to populate the model. Thus, claim 5 requires: "... receiver to receive data related to said problem, for populating a model for said problem; a data converter to convert said received data into data structures that thereby populate said model ...." Claim 8 requires: "... a data converter, as executed by a processor on said apparatus, to convert said received data into data structures that thereby populate a model for said problem ...."

This model population is exemplarily shown as steps 301 and 302 of Figure 3 of the present application.

There is nothing corresponding to a model construction in Michalewicz. In the rejection of record the Examiner seemingly relies primarily on paragraph [0059] as allegedly demonstrating this element and more particularly, upon the description that "... *input data is organized into modules*".

However, this paragraph continues on: "*In embodiments, one module includes the number of variables, their domains, and all linear constraints. In embodiments, another module indicates the objective function, while a third module includes all nonlinear constraints.*"

Therefore, the "modules" of Michalewicz's method receive input data to define the problem.

In contrast, the claimed invention involves input data that is converted into a model of the

problem, as populated by converting that input data. The two calculators described in claims 5 and 8 then operate over this data model, as having been formed by populating the model using the input data.

The “modules” of paragraph [0059] of Michalewicz are not receiving input data that is converted into a data model appropriate for a min/max problem. The populated model of the present invention can then be exercised by the two calculators described in the independent claims, one that minimizes over a first domain of independent variables and one that optimizes using a second domain of independent variables.

Similar to the previous evaluation technique used by Director Garber in the telephone interview last April concerning the rejection of record based on Chiang, the current evaluation based on newly-cited Michalewicz also improperly attempts to selectively ignore words from the claim language that are important words in distinguishing from the prior art references. Such selective choice of wording does not reflect the perspective of one having ordinary skill in the art.

The claimed invention receives input data that is converted into a model appropriate for a min/max problem. This model is then exercised by two calculators, one that determines the minimum over a first set of independent variables and a second that then determines the global optimum by evaluating the results of the first calculator and using a second set of independent variables.

There is no concept in either previously-cited Chiang or newly-cited Michalewicz that correlates with this technique of initially converting input data in order to populate a model of a min/max problem and then using that populated model as data to exercise two calculators using two different domains of independent variables to ultimately derive the global solution from the model.

Hence, turning to the clear language of the claims, in Michalewicz there is no teaching or suggestion of: “... a receiver to receive data related to said problem, for populating a model for said problem; a data converter to convert said received data into data structures that thereby populate said model; a first calculator, as executed by a processor on said apparatus, to provide a plurality of minimum values of said model; a second calculator, as executed by said processor, to locate a global optimum value for said problem, given said plurality of minimum values ....”, as required by independent claim 5.

Relative to independent claim 8, there is no teaching or suggestion of: "... a data converter, as executed by a processor on said apparatus, to convert said received data into data structures that thereby populate a model for said problem; a first calculator to provide a plurality of minimum values of said problem data, based on said populated model; and a second calculator to locate a global optimum value for said problem, given said plurality of minimum values ...."

Therefore, Applicants submit that there are elements of the claimed invention that are not taught or suggested by newly-cited Michalewicz, and the Office is respectfully requested to reconsider and withdraw this rejection.

### III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicants submit that claims 1-6, 8-17, and 19-23, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,



Date: February 10, 2011

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